

CLAIMS

What is claimed is:

1. A prosthetic wrist implant comprising:
  - (a) a radial component including a base member having an upper  
5 bearing surface and a lower surface having an elongated radial stem  
extending therefrom for fixation to a radius bone;
  - (b) a carpal component including a substantially planar base member  
having an upper surface having an elongated carpal post member  
for fixation to one or more carpal bones, an outer edge, and a lower  
10 surface with at least one socket protrusion extending therefrom;
  - (c) an articulating bearing component for placement between the radial  
and carpal components, the bearing component having an upper  
surface defining at least one socket recess and a lower bearing  
surface for cooperative engagement with the upper bearing surface  
15 of the radial component; and
  - (d) wherein the socket protrusion of the carpal component is adapted to  
linearly engage the socket recess of the bearing component to  
desirably limit rotational and translational movement of the carpal  
component relative to the bearing component.
- 20 2. The prosthetic wrist implant according to claim 1 wherein the elongated  
radial stem of the radial component is in an off-center position in relation to  
a center of the lower surface of the radial component.

3. The prosthetic wrist implant according to claim 1 wherein the articulating bearing component further comprises a substantially continuous extended skirt of material around the perimeter of and extending from the upper surface of the bearing component, the extended skirt further defining a skirt upper edge furthest away from the upper surface.
4. The prosthetic wrist implant according to claim 3 wherein the skirt at least substantially surrounds the carpal component planar base member outer edge when the socket protrusion of the carpal component is engaged with the socket recess of the bearing component.
5. The prosthetic wrist implant according to claim 4 wherein the skirt upper edge is disposed upon a plane that is substantially coplanar with the carpal component planar base member upper surface.
6. The prosthetic wrist implant according to claim 1 wherein the upper bearing surface of the radial component is at least substantially concave.
7. The prosthetic wrist implant according to claim 6 wherein the lower bearing surface of the bearing component is at least substantially convex in proportional relationship to the substantially concaved upper bearing surface of the radial component.
8. The prosthetic wrist implant according to claim 1 wherein the socket protrusion of the carpal component is substantially cylindrical and further comprises an external lip that is continuous around the circumference of the socket protrusion.

9. The prosthetic wrist implant according to claim 8 wherein the socket recess of the bearing component is substantially cylindrical and further comprises an internal groove that is continuous around the circumference of the socket recess.
- 5 10. The prosthetic wrist implant according to claim 9 wherein the upper surface of the articulating bearing component is attached to the planar base member lower surface of the carpal component by an external lip of the socket protrusion of the carpal component matingly engaging an internal groove of the socket recess of the bearing component.
- 10 11. The prosthetic wrist implant according to claim 1 wherein the articulating bearing component is constructed of a plastic material.
12. The prosthetic wrist implant according to claim 1 wherein the lower surface of the radial component has a first substantially flat portion and a second substantially flat portion disposed at an angle with respect to the first flat  
15 portion.
13. The prosthetic wrist implant according to claim 1 wherein the elongated radial stem of the radial component is fixated to the radius bone through the use of bone cement.
14. The prosthetic wrist implant according to claim 1 wherein the elongated  
20 radial stem of the radial component is fixated to the radius bone through press-fitting.

15. A prosthetic wrist implant comprising:

- (a) a radial component including a base member having an upper bearing surface and a lower surface having an elongated radial stem extending therefrom for fixation to a radius bone;
- 5 (b) a carpal component including a substantially planar base member having an upper surface having an elongated carpal post member for fixation to one or more carpal bones, an outer edge, and a lower surface with a pair of socket protrusions extending therefrom, wherein each socket protrusion defines an opening therethrough  
10 adapted for receiving a screw;
- (c) an articulating bearing component for placement between the radial and carpal components, the bearing component having an upper surface defining a pair of socket recesses, and the bearing component having a lower bearing surface for cooperative  
15 engagement with the upper bearing surface of the radial component; and
- (d) wherein the pair of socket protrusions of the carpal component is adapted to linearly engage the pair of socket recesses of the bearing  
20 component to desirably limit rotational and translational movement of the carpal component relative to the bearing component.

16. The prosthetic wrist implant according to claim 15 wherein the elongated radial stem of the radial component is in an off-center position in relation to a center of the lower surface of the radial component.
17. The prosthetic wrist implant according to claim 15 wherein the articulating  
5 bearing component further comprises a substantially continuous extended skirt of material around the perimeter of and extending from the upper surface of the bearing component, the extended skirt further defining a skirt upper edge furthest away from the upper surface.
18. The prosthetic wrist implant according to claim 17 wherein the skirt at least  
10 substantially surrounds the carpal component planar base member outer edge when the socket protrusion of the carpal component is engaged with the socket recess of the bearing component.
19. The prosthetic wrist implant according to claim 18 wherein the skirt upper  
15 edge is disposed upon a plane that is substantially coplanar with the carpal component planar base member upper surface.
20. The prosthetic wrist implant according to claim 15 wherein the upper bearing surface of the radial component is at least substantially concave.
21. The prosthetic wrist implant according to claim 20 wherein the lower  
20 bearing surface of the bearing component is at least substantially convex in proportional relationship to the substantially concaved upper bearing surface of the radial component.

22. The prosthetic wrist implant according to claim 15 wherein the socket protrusion of the carpal component is substantially cylindrical and further comprises an external lip that is continuous around the circumference of the socket protrusion.
- 5 23. The prosthetic wrist implant according to claim 22 wherein the socket recess of the bearing component is substantially cylindrical and further comprises an internal groove that is continuous around the circumference of the socket recess.
24. The prosthetic wrist implant according to claim 23 wherein the upper  
10 surface of the articulating bearing component is attached to the planar base member lower surface of the carpal component by an external lip of the socket protrusion of the carpal component matingly engaging an internal groove of the socket recess of the bearing component.
25. The prosthetic wrist implant according to claim 15 wherein the articulating  
15 bearing component is constructed of a plastic material.
26. The prosthetic wrist implant according to claim 15 wherein the lower surface of the radial component has a first substantially flat portion and a second substantially flat portion disposed at an angle with respect to the first flat portion.
- 20 27. The prosthetic wrist implant according to claim 15 wherein the elongated radial stem of the radial component is fixated to the radius bone through the use of bone cement.

28. The prosthetic wrist implant according to claim 15 wherein the elongated radial stem of the radial component is fixated to the radius bone through press-fitting.
29. A prosthetic wrist implant for implantation between a patient's radius bone and carpal bone complex comprising:
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- (a) a radial component including a base member having an upper bearing surface and a lower surface having an elongated radial stem extending therefrom that is implanted into a radius bone;
- (b) a carpal component including a substantially planar base member having an upper surface having an elongated carpal post member that is implanted into the capitate bone of the carpal bone complex, a lower surface with a pair of socket protrusions extending therefrom, wherein each socket protrusion defines an opening therethrough adapted for receiving a screw, and further wherein a screw is implanted into the trapezoid bone and another screw is implanted into the hamate bone of the carpal bone complex;
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- (c) an articulating bearing component for placement between the radial and carpal components, the bearing component having an upper surface defining a pair of socket recesses, and the bearing component having a lower bearing surface for cooperative engagement with the upper bearing surface of the radial component; and
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(d) wherein the pair of socket protrusions of the carpal component is adapted to linearly engage the pair of socket recesses of the bearing component to desirably limit rotational and translational movement of the carpal component relative to the bearing component.

5     30.     The prosthetic wrist implant according to claim 29 wherein the elongated radial stem of the radial component is in an off-center position in relation to a center of the lower surface of the radial component.

31.     A prosthetic wrist implant for implantation between a patient's radius bone and carpal bone complex comprising:

10         (a)     a radial component including a base member having an upper bearing surface and a lower surface having an elongated radial stem extending therefrom for fixation to a radius bone;

       (b)     a carpal component including a substantially planar base member having an upper surface and a lower surface with a pair of socket protrusions extending therefrom, wherein each socket protrusion defines an opening therethrough adapted for receiving a screw and further wherein the planar base member further defines another opening therethrough situated between the openings defined by each socket protrusion;

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20         (c)     a plurality of screws inserted through the openings for securing the carpal component to the carpal bone complex;



- 5 (d) an articulating bearing component for placement between the radial and carpal components, the bearing component having an upper surface defining a pair of socket recesses, and the bearing component having a lower bearing surface for cooperative engagement with the upper bearing surface of the radial component; and
- 10 (e) wherein the pair of socket protrusions of the carpal component is adapted to linearly engage the pair of socket recesses of the bearing component to desirably limit rotational and translational movement of the carpal component relative to the bearing component.
32. The prosthetic wrist implant according to claim 31 wherein the elongated radial stem of the radial component is in an off-center position in relation to a center of the lower surface of the radial component.
33. A prosthetic wrist implant system comprising:
- 15 (a) a plurality of different sized radial components, each radial component including a base member having an upper bearing surface and a lower surface having an elongated radial stem extending therefrom for fixation to a radius bone;
- 20 (b) a plurality of different sized carpal components, each carpal component including a substantially planar base member having an upper surface having an elongated carpal post member for fixation

to one or more carpal bones and a lower surface with at least one socket protrusion extending therefrom;

- 5 (c) a plurality of different sized articulating bearing components for placement between correspondingly sized radial and carpal components, each bearing component having an upper surface defining at least one socket recess and a lower bearing surface for cooperative engagement with the upper bearing surface of a correspondingly sized radial component; and
- 10 (d) wherein the socket protrusion of the selected carpal component is adapted to linearly engage the socket recess of a correspondingly sized bearing component to desirably limit rotational and translational movement of the carpal component relative to the bearing component.
- 15 34. The prosthetic wrist implant system according to claim 33 wherein the elongated radial stem of the radial component is in an off-center position in relation to a center of the lower surface of the radial component.
35. A method for implanting a prosthetic wrist implant in a wrist area, the method comprising:
- 20 (a) providing a radial component including a base member having an upper bearing surface and a lower surface having an elongated radial stem extending therefrom for fixation to a radius bone;

- (b) providing a carpal component including a substantially planar base member having an upper surface having an elongated carpal post member for fixation to one or more carpal bones and a lower surface with at least one socket protrusion extending therefrom;
- 5 (c) providing an articulating bearing component for placement between the radial and carpal components, the bearing component having an upper surface defining at least one socket recess and a lower bearing surface for cooperative engagement with the upper bearing surface of the radial component;
- 10 (d) surgically opening a patient's wrist area and exposing a radius bone and carpal bone complex bones;
- (e) resectioning the radius bone along a plane which is at an angle with a normal plane that is perpendicular to the longitudinal axis of the radius bone;
- 15 (f) broaching the radius bone, forming a radius bone broach;
- (g) positioning the radial component within the radius bone broach and adjacent to the radius bone so that the lower surface of the radial component abuts the resected radius bone;
- (h) resectioning the carpal bone complex along a plane which is at an angle with a plane that is perpendicular to the longitudinal axis of the
- 20 capitate metacarpal bone;

- (i) positioning the carpal component adjacent to the carpal bone complex so that the upper surface of the carpal component abuts the resected carpal bone complex;
  - (j) securing the radial and carpal components to the radius bone and carpal bone complex respectively; and
  - (k) linearly engaging the socket protrusion of the carpal component to the socket recess of the bearing component to desirably limit rotational and translational movement of the carpal component relative to the bearing component.
- 10 36. The method according to claim 35 wherein the elongated radial stem of the radial component is in an off-center position in relation to a center of the lower surface of the radial component.
37. The method according to claim 35 wherein broaching the radius bone is guided by a radial alignment guide rod.
- 15 38. The method according to claim 37 wherein positioning the radial component within the radius bone broach is provided by the radial alignment guide rod.
39. A method for implanting a prosthetic wrist implant in a wrist area, the method comprising:
- (a) surgically opening a patient's wrist area and exposing a radius bone and carpal bone complex bones;
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- (b) resectioning the radius bone along a plane which is at an angle with a normal plane that is perpendicular to the longitudinal axis of the radius bone;
- (c) broaching the radius bone, forming a radius bone broach
- 5 (d) from a plurality of different sized radial components, selecting a radial component including a base member having an upper bearing surface and a lower surface having an elongated radial stem extending therefrom for fixation to a radius bone;
- (e) positioning the selected radial component within the radius bone
- 10 broach and adjacent to the radius bone so that the lower surface of the radial component abuts the resected radius bone;
- (f) resectioning the carpal bone complex along a plane which is at an angle with a plane that is perpendicular to the longitudinal axis of the capitate metacarpal bone;
- 15 (g) from a plurality of different sized carpal components, selecting a carpal component including a substantially planar base member having an upper surface having an elongated carpal post member for fixation to one or more carpal bones and a lower surface with at least one socket protrusion extending therefrom;
- 20 (h) positioning the selected carpal component adjacent to the carpal bone complex so that the upper surface of the carpal component abuts the resected carpal bone complex;

- (i) securing the radial and carpal components to the radius bone and carpal bone complex respectively;
  - (j) from a plurality of different sized articulating bearing components for placement between correspondingly sized radial and carpal components, selecting a bearing component having an upper surface defining at least one socket recess and a lower bearing surface for cooperative engagement with the upper bearing surface of a correspondingly sized radial component; and
  - (k) linearly engaging the socket protrusion of the carpal component to the socket recess of the selected bearing component to desirably limit rotational and translational movement of the carpal component relative to the bearing component
40. The method according to claim 39 wherein the elongated radial stem of the radial component is in an off-center position in relation to a center of the lower surface of the radial component.
41. The method according to claim 39 wherein broaching the radius bone is guided by a radial alignment guide rod.
42. The method according to claim 41 wherein positioning the radial component within the radius bone broach is provided by the radial alignment guide rod.